

## Memorandum

Date

October 31, 1989

From

Acting Assistant Director, Health Assessment Coordination  
Division of Health Assessment and Consultation

Subject

Review of Working Draft Health Assessment

To

Joel S. Mulder  
Public Health Advisor  
EPA Region 1RECEIVED  
MAR 12 1990  
SUPERFUND BRANCHEnclosed is the working draft Health Assessment for the following site(s):Tesco Corp.

The author of the draft (s) is:

Ken Colloff

In accordance with ATSDR Transmittal Notice TN-88, 7 (Communications Procedures: Health Assessments), please review the enclosed and return your written comments within thirty days (by November 31, 1989) to me, that they may be logged in by the Coordination Activity. Your comments will then be forwarded to the author or the reviewer, whichever is appropriate. (Please note that if we do not receive your comments by the due date or otherwise hear from you that they are being prepared, we will assume that you find the enclosed draft(s) acceptable, and will proceed with preparation of the final draft).

After your comments have been received and evaluated, we will prepare a final draft in red cover for the EPA and forward copies to you.

We look forward to hearing from you and will appreciate your input.

Chester L. Tate, Jr.  
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cc:

George Buynoski

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## SUMMARY

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The Tosco Corporation site is a National Priorities Update 7 site located 1.5 miles north of Spokane in eastern Washington. Industrial activities, which have been conducted at the site since the 1920s, have resulted in contamination of environmental media with petroleum-derived chemicals. High concentrations of volatile aromatic compounds and polyaromatic hydrocarbons were detected in on-site soils and groundwater. The migration of contaminated groundwater from the site has impacted off-site private wells, but, to date, there is no evidence that any public water supply wells have been impacted. The use of contaminated water for potable or nonpotable purposes could result in exposures of potential health concern by ingestion, inhalation, or dermal absorption. Human contact with oil wastes in the former lagoon area could result in exposures of health concern by the ingestion, dermal absorption, or inhalation of contaminants. Such exposures would be most likely to occur during excavations in the lagoon area.

## BACKGROUND

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The Tosco Corporation site is located about 5 miles northeast of the central business district of Spokane, Washington. The site, which was previously known as the North Market Street site, occupies approximately 50 acres of land in an industrialized area.

The Tosco site is currently being used as a tank farm for the bulk storage of petroleum products. Tosco purchased the property in 1976 from the Petroleum Terminal Company, a subsidiary of the Phillips Petroleum Company (PPC). While under PPC ownership, the site operated as an oil refinery until it was decommissioned in 1953.

An unlined waste oil lagoon was located in the northwest corner of the Tosco site. A portion of this lagoon reportedly extended onto the adjacent property owned by the Draper Tractor Company. Approximately 1,000 cubic yards of oily soil were removed from the Draper property and disposed in Colbert Landfill. The lagoon has been covered with clean soil and is currently fenced.

Since the 1920s, the site has been used for various activities associated with oil product refining, recycling, storage, disposal, transportation, and sales. As a result of these activities, soil and groundwater at the site have become contaminated with petroleum compounds. Because of the presence of numerous businesses and industries in the area, there may be



additional sources of groundwater contamination off-site. Within approximately 1 mile of the intersection of North Market Street and Freya Street/Regal Street, the U.S. Environmental Protection Agency (EPA) has identified 16 Potentially Responsible Parties (PRP). Many of the PRPs are businesses that handle petroleum products. <sup>no. Ecology</sup> has

The Phase I Remedial Investigation (RI) Report for the site was released in October 1985, and the Data Compilation Report for the Phase I, II, and III Remedial Investigations was released in March 1988 (1,2).

#### B. SITE VISIT

The ATSDR personnel toured the site with representatives of Tosco and the Phillips Petroleum Company on March 17, 1989.

An on-site building is used for administrative operations. Portions of this building are leased to the Chevron Oil Company. The above-ground petroleum storage tanks are surrounded by soil berms. There is heavy on-site tanker truck traffic resulting from loading and unloading operations. The site is surrounded by a 6-foot high chain-link fence topped with barbed wire. No evidence of trespassing was noticed during the ATSDR site visit.

#### DEMOGRAPHICS, LAND, AND RESOURCE USE

The Tosco site is located on land zoned as a "manufacturing zone." This allows for manufacturing and processing activities of all types. The

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nearest residential area is the Morgan Acres Community, which is located about one-fourth of a mile southwest of the site. The homes in this community are serviced by a public water system. The closest school is approximately 1 mile away. A well inventory conducted by an EPA contractor identified 228 private wells within a 3-mile radius of the site (1). — The reference to this is an Ecology Financial Study, — change EPA's study

## ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

### A. ON-SITE CONTAMINATION

During the RI, groundwater from on-site and off-site wells, and soil from test pits and borings in the lagoon area were analyzed for contamination. All samples were analyzed for volatile organics, and selected samples were scanned for total priority pollutants (excluding pesticides). Laboratory analyses were performed by an EPA-approved laboratory. — EPA doesn't have an approved program for labs

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TABLE 1: ON-SITE CONTAMINATION - GROUNDWATER

Chemical	Maximum Concentration (ug/l) (1)
benzene	43
toluene	42
ethylbenzene	14
naphthalene	450
2-methylnaphthalene	1,400
fluorene	250
phenanthrene	370
benzo(a)pyrene	14
indeno(1,2,3-cd)pyrene	18
dibenz(a,h)anthracene	11

(1) These results were obtained for a water sample collected from the most highly contaminated on-site monitoring well (NM-4) on November 9, 1987. The sample, which was collected near the former lagoon area, was a 2-layer (non-aqueous phase liquid floating on top of the groundwater) liquid sample with a diesel oil odor. These results are for the lower aqueous phase.

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TABLE 2: ON-SITE CONTAMINATION - SOIL

Chemical	Maximum Concentration (mg/kg) (1)
benzene	11
toluene	56
ethylbenzene	26
total xylenes	170
naphthalene	52
2-methylnaphthalene	190
fluorene	25
phenanthrene	76
pyrene	28
lead	365

(1) These results were obtained for the most highly contaminated test pit soil sample (TP-8) collected in the former lagoon area in May 1986.

## B. OFF-SITE CONTAMINATION

TABLE 2: OFF-SITE CONTAMINATION - GROUNDWATER

Chemical	Concentration (ug/l) (1)
benzene	100
toluene	6.3
ethylbenzene	55
m-xylene	42
o and p-xylene	120

(1) These results were obtained for a water sample collected from an off-site well (Schmidt well #46) on May 18, 1987. This well is located about 650 feet north of the former lagoon area.

## C. QUALITY ASSURANCE AND QUALITY CONTROL

In preparing this Health Assessment, ATSDR relies on the information provided in the referenced documents and assumes that adequate quality assurance and quality control measures were followed with regards to chain-of-custody, laboratory procedures, and data reporting. The validity of the analyses and conclusions drawn for this Health Assessment is determined by the availability and reliability of the referenced information.



#### D. PHYSICAL AND OTHER HAZARDS

No physical hazards were identified at the site other than those associated with normal operations of the facility.

#### PATHWAYS ANALYSES

##### A. ENVIRONMENTAL PATHWAYS

Analytical data have documented the presence of numerous petroleum-derived contaminants in soils in the area of the former oil lagoon. Some of the contaminated soil has been removed, and clean fill has been placed over the lagoon area. It has been reported that discharges of "tar" to the surface have occurred in the lagoon area of the Tosco and Draper properties. It is possible for these petroleum-derived contaminants to migrate to the groundwater below. It is also possible for the contaminated soil to become windborne, especially if the lagoon were to be excavated. No data were provided on off-site surface contamination or ambient air contamination, so it cannot be determined if there are significant concentrations of contaminants in on-site or off-site ambient air or off-site surface soil.

The site is located over the Hillyard Trough of the Spokane Valley - Rathdrum Prairie Aquifer. The EPA has designated this aquifer as a sole source of drinking water under the Safe Drinking Water Act. Well drilling logs indicate that the glaciofluvial deposits in the area consist mostly of sand with some gravel and clay layers. Water levels at the site are

change to 147 feet as per EPA SI.

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150-170 feet below ground surface, and the general groundwater flow is in a north-northwesterly direction. In the area of the former oil lagoon, there is a large quantity of a non-aqueous phase liquid (NAPL) floating on the underlying aquifer. The migration of contaminated groundwater from the site has impacted off-site wells, but the extent of contamination has not been defined.

Public water in the area is supplied by the Northern Spokane Irrigation District which obtains water from wells tapping the Spokane Valley - Rathdrum Prairie Aquifer. The nearest public water supply well (#GA-22) is located less than 0.5 mile southwest of the site, which is in an upgradient direction. No public water supply wells are located within 1 mile of the site in a downgradient direction. Monitoring of the public water supply wells has not detected, to date, any site-related contamination.

Several volatile organic chemicals (VOCs) and polyaromatic hydrocarbons (PAHs) were detected in water samples collected from on-site wells. The same VOCs were also detected in off-site wells, although other off-site sources may have contributed to the contamination. The information provided to ATSDR indicated that private wells with known contamination were not being used for potable purposes.

It is unlikely that consumable animals or plants could be found in the immediate vicinity of the site, as the area is an industrial area. Also, there is no downslope surface water within 3 miles of the site (3).

## B. HUMAN EXPOSURE PATHWAYS

1. The use of contaminated groundwater for potable and nonpotable use could result in exposures to site-related chemicals by ingestion, inhalation, or dermal absorption.
2. High concentrations of VOCs and PAHs were detected in soil samples from test pits dug in the former oil lagoon area. Human contact with these waste materials could result in exposure via ingestion, dermal absorption, or inhalation.
3. The Tosco site is fenced so it is unlikely that hunting or other food gathering activities occur on-site.

## PUBLIC HEALTH IMPLICATIONS

Groundwater from on-site and off-site wells was contaminated with several aromatic hydrocarbons including benzene, ethyl benzene, toluene, and xylene. The presence of these compounds in potable water can lead to their direct ingestion from drinking water or from water used in food or beverage preparation. Volatile compounds, such as benzene, may also be released to indoor air from water during showering, dish washing, and other nonpotable water use in the home. The subsequent inhalation of these compounds in the indoor air may result in a dose that is comparable to the oral ingestion dose. These compounds may also be absorbed through



the skin during bathing and other dermal contact with water. However, it is likely that the dose resulting from dermal absorption would be less than the dose derived from oral or inhalation exposures.

Of these compounds, benzene poses the greatest potential health concern because of its demonstrated toxicity to bone marrow. Occupational exposure to benzene has been correlated with an increased incidence of blood dyscrasias, aplastic anemia, and leukemia.

Benzene was detected in groundwater from 2 downgradient, off-site wells (Schmidt #46 and R. A. Hansen #52) at concentrations in excess of the drinking water standard set by the EPA (5 ug/l). It was reported that these wells are at business locations and are not being used for potable purposes. However, the use of water from these wells for nonpotable purposes, such as washing and toilet flushing, could lead to dermal or inhalation exposures to VOCs. The public water system is reportedly extending water lines into this area which should eliminate the need for private wells for potable or nonpotable water.

Polyaromatic hydrocarbons were also detected in groundwater samples from an on-site well and in soil samples from a test pit in the former lagoon area. Exposure to PAHs is of potential concern because of the carcinogenicity of some PAHs and PAH mixtures (4). In laboratory experiments, PAHs are potent inducers of skin cancer when applied dermally to mice and rats. In addition, PAHs are carcinogenic in animals when ingested, injected, or intratracheally instilled.



Studies of human exposure to PAHs have been conducted among coke plant workers and coal gas production workers (5). Epidemiological studies of these workers have revealed an association between occupational exposure to combustion products containing PAHs and cancer of the lung, pancreas, kidney, bladder, and skin. Interpretation of these studies is confounded by simultaneous exposure to other combustion products, as well as by additional chemical carcinogenic exposure from cigarette smoking.

Dermal contact with PAHs is of concern since PAHs can be absorbed by intact human skin and activated to chemically-reactive intermediates that may be involved in chemical carcinogenesis (6,7). In addition, some PAHs, such as anthracene, acridine, or phenanthrene, can produce phototoxic skin reactions. Dermal exposure to these compounds, followed by exposure to sunlight, can produce skin erythema, urticaria, and burning and itching. These phototoxic effects will usually disappear when the irritant or sensitizer is eliminated.

Because of these concerns, human contact with PAH-contaminated soils and wastes in the former oil lagoon area should be avoided. The opportunity for human contact these oil wastes has been reduced by covering the lagoon with clean fill and placing a fence around the area. However, future excavation or construction activities in the area could expose workers to buried wastes. The unearthing of these materials could also result in the release of VOCs to the ambient air and their subsequent inhalation by on-site and off-site personnel.

## CONCLUSIONS

This site is of potential health concern because of the risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. As noted above, human exposure to site-related contaminants may occur through the use of contaminated groundwater for potable or nonpotable use. Direct contact with contaminated soils and waste materials may also result in exposures by ingestion, inhalation, and dermal absorption. This pathway would be of particular concern during excavations in the lagoon area.

## RECOMMENDATIONS

1. Potable and nonpotable wells located downgradient of the site should be regularly monitored for site-related contamination.
2. Owners of potable or nonpotable wells that have been contaminated with volatile organic chemicals or other chemicals should be connected to the public water system, if available. If it is not possible to connect to the public water system, the use of point-of-use treatment devices, such as activated carbon filters, should be considered.
3. Access to the former lagoon area should be restricted to properly protected and informed personnel.

4. On-site and off-site ambient air monitoring should be conducted to determine if volatile contaminants from the site pose a public health concern.
5. During excavation activities in the lagoon area, workers should be protected in accordance with Occupational Safety and Health Administration regulations and National Institute of Occupational Safety and Health recommendations. Appropriate air monitoring should be conducted to insure that on-site workers and off-site residents and neighbors are not exposed to unacceptable concentrations of dusts or airborne chemicals.

In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, the Tosco Corporation site has been evaluated for appropriate follow-up with respect to health effects studies. Although there are indications that human exposure to on-site/off-site contaminants may be currently occurring and may have occurred in the past, this site is not being considered for follow-up health studies at this time because data are not available for this decision.

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## REFERENCES

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1. Golder Associates, Inc., Final Report to State of Washington Department of Ecology: Phase I Remedial Investigation of the North Market Street Site, Volume I, October 1985.
2. Golder Associates, Inc., Report to State of Washington Department of Ecology: Data Compilation Report for the North Market Street Site Phases I, II, and III Remedial Investigations, March 1988.
3. U.S. Environmental Protection Agency Hazard Ranking System packet, September 18, 1987.
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